

WHAT IS CLAIMED IS:

1. A vehicle monitoring system that monitors the state of a plurality of vehicles,
said system comprising:

at least one mobile data unit that generates automatic status information
5 corresponding to a delivery vehicle, wherein the automatic status information includes
position information and delivery state information;

a delivery state database that store the automatic status information generated by the
mobile data unit.

2. A vehicle monitoring system as claimed in claim 1, further comprising dispatch
10 monitoring means for accessing the automatic status information stored in the delivery
state database and displaying the automatic status information to provide a visual
indication of the identity of the delivery vehicle, the position of the delivery vehicle and the
delivery state of the delivery vehicle.

3. A vehicle monitoring system as claimed in claim 2, wherein the dispatch
15 monitoring means displays the automatic status information on a display monitor in the
form of an icon, wherein a display condition of the icon is varied in accordance with a
delivery state defined by the delivery state information.

4. A vehicle monitoring system as claimed in claim 3, wherein the display condition includes at least one of the shape, color, size, contrast or display status of the icon.

5 5. A vehicle monitoring system as claimed in claim 1, wherein the mobile data unit includes a controller, GPS receiver coupled to the controller, and at least one vehicle condition sensor coupled to the controller, wherein the controller generates the automatic status information based on signals received from the GPS receiver and the vehicle condition sensor.

6. A vehicle monitoring system as claimed in claim 5, wherein the controller determines the delivery state information based on the signal received from the vehicle condition sensor.

5 Sub 102 7. A vehicle monitoring system as claimed in claim 6, wherein the vehicle condition sensor generates a mixing barrel status signal indicative of a charge operation condition and a discharge operating condition of a mixing barrel, and wherein the controller determines a Begin Pour delivery state and an End Pour delivery state based on the mixing barrel status signal.

8. A vehicle monitoring system as claimed in claim 5, wherein the delivery state information includes a plurality of delivery states that define a delivery cycle, and wherein the controller determines whether a current delivery state is valid based on the delivery cycle.

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9. A vehicle monitoring system as claimed in claim 8, wherein the controller determines whether a current delivery state is valid based on whether a prerequisite deliver state within the delivery cycle has occurred.

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Sub 23
10. A vehicle monitoring system as claimed in claim 1, wherein the mobile data unit includes a wireless transmitter/receiver that transmits the automatic status information from the mobile data unit to the delivery state database via wireless transmission device coupled to the deliver state database.

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11. A vehicle monitoring system as claimed in claim 10, further comprising:
a dispatch monitoring means for accessing the automatic status information stored in the delivery state database and displaying the automatic status information to provide a visual indication of the identity of the delivery vehicle, the position of the delivery vehicle and the delivery state of the delivery vehicle; and

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wherein the dispatch monitoring means includes data entry means for entering messages that are transmitted to the mobile data unit via the wireless transmission device and the wireless transmitter/receiver.

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12. A vehicle monitoring system as claimed in claim ~~11~~⁸, wherein the mobile data unit includes a display unit that displays the messages transmitted to the mobile data unit from the dispatch monitoring means.

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13. A vehicle monitoring system as claimed in claim ~~12~~^{.9}, wherein the mobile data unit includes data entry means for entering messages that are transmitted to the dispatch monitoring means via the wireless transmitter/receiver and the wireless transmission device.

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14. A vehicle monitoring system as claimed in claim ~~13~~, wherein the messages transmitted to the dispatch monitoring means from the mobile data unit and to the mobile data unit from the dispatch monitoring means are transmitted in the form of cellular digital packet data.

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15. A vehicle monitoring system as claimed in claim ~~10~~, wherein the automatic status information is automatically transmitted to the delivery status database when a change in deliver state information occurs.

20 Sub 16. A vehicle monitoring system as claimed in claim 5, wherein hot zone data corresponding to geographic zone around at least one of a loading terminal and a delivery site is supplied to the mobile data unit, and wherein the controller determines the delivery state information based on the hot zone data.

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~~17~~. A vehicle monitoring system as claimed in claim ~~16~~, wherein the controller alters the hot zone data in response to certain delivery states defined by the delivery state information.

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~~18~~. A vehicle monitoring system as claimed in claim ~~17~~, wherein the controller alters the hot zone data to expand the geographic zone when the delivery state information is indicative of an At Job delivery state to thereby avoid problems associated with GPS jitter.

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~~19~~. A vehicle monitoring system as claimed in claim ~~18~~, wherein the controller disables position detection when the delivery vehicle enters a geographic zone defined by the hot zone data to avoid problems associated with GPS jitter.

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~~20~~. A vehicle monitoring system as claimed in claim ~~19~~, wherein the controller alters the hot zone data to relocate the geographic zone when the delivery state information is indicative of a change in location of a delivery site.

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~~21~~. A vehicle monitoring system as claimed in claim ~~20~~, wherein a vehicle condition sensor is provided that generates a vehicle velocity signal, and at least one of the Begin Pour delivery state and the End Pour delivery state is determined by the controller based on the mixing barrel status signal and the vehicle velocity signal.

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~~22~~. A vehicle monitoring system as claimed in claim ~~21~~, wherein the controller determines if the End Pour delivery state is valid if: a) a valid At Job state has been determined; b) a valid Begin Pour state has been determined; c) the mixing drum status signal indicates a charge condition; and d) at least one of the following conditions is true:
5 1) the signal received from the GPS receiver indicate the delivery vehicle is outside of a specified hot zone; or 2) the velocity signal indicates delivery vehicle is moving at a velocity greater than a predetermined minimal threshold.

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~~23~~. A vehicle monitoring system as claimed in claim ~~21~~, wherein the controller determines if the Begin Pour delivery state is valid if: 1) the velocity signal indicates the delivery vehicle is moving at a velocity less than a predetermined threshold value; and 2) the mixing drum status signal indicates a discharge condition.

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~~24~~. A vehicle monitoring system as claimed in claim ~~23~~, wherein the controller further determines if the Begin Pour delivery state is valid if at least one of: a) a valid At Job state is determined; and b)) the signal received from the GPS receiver indicates the delivery vehicle is outside of a hot zone corresponding to a loading terminal.

25. A method of providing automatic status information for a plurality of delivery vehicles, wherein the automatic status information includes position information and delivery state information, said method comprising:

determining position information corresponding to each of the delivery vehicles using a GPS data;

determining delivery state information corresponding to each of the delivery vehicles using at least one vehicle condition sensor provided on each of the delivery vehicles;

transmitting the position information and delivery state information to a delivery state database via a wireless transmission network.

26. A method of providing automatic status information as defined in claim 25, further comprising defining a plurality of delivery states corresponding to a delivery cycle, wherein the delivery state information comprises the delivery states, and wherein the validity of a current delivery state is determined based on whether a prerequisite deliver state has occurred.

27. A method of providing automatic status information as claimed in claim 26, wherein the delivery state include a Begin Pour delivery state and an End Pour delivery state associated with the delivery of ready-mix concrete.